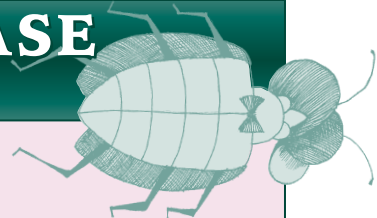


ACTIVITY 10 GRADES 8-12

Galerucella RELEASE AND RETRIEVAL



Objectives

- ➔ Students will determine how far *Galerucella* beetles will travel in a controlled, indoor setting to find their host food (migration).
- ➔ Students will determine factors that may cause unsuccessful migration of *Galerucella* beetles in a controlled, indoor setting (mortality/survival rates).
- ➔ Students will discuss their findings and relate them to real life factors in nature that might affect migration and mortality/survival during migration of *Galerucella* beetles.

Time Requirement

5 minutes initially;
occasional 20 minutes
on an ongoing basis.

Wisconsin Model Environmental Education and Science Standards

Environmental Education: A.8.2, A.8.3, A.8.4, A.12.2. *Science:* F.8.6, F.12.12.

DESCRIPTION

Students design and conduct experiments in a controlled indoor setting to study migration and mortality/survival rates during migration of *Galerucella* beetles. Beetles can be observed after release from captivity in mid-summer or during natural emergence from the ground in early spring or mid-summer.

PROBLEM

What are some of the factors that may affect beetle migration and mortality/survival rates during migration?

MATERIALS

- ☐ Live *Galerucella* beetles.
- ☐ Various potted plants, including purple loosestrife.
- ☐ Student observation notebooks.



Galerucella beetles actively seek out loosestrife plants, even potted plants placed throughout your classroom.

PREPARATION

If necessary, obtain permission from your principal and/or custodian to do this experiment.

PROCEDURES

1. In your classroom, set various plants around the room, including a purple loosestrife plant.
2. After school, release a predetermined number of *Galerucella* beetles into the center of the room (25-50 should be sufficient, more or less depending on the circumstances).
3. Have students brainstorm places where beetles might be found in the classroom (i.e. the window, the lights, sink, or the plants).



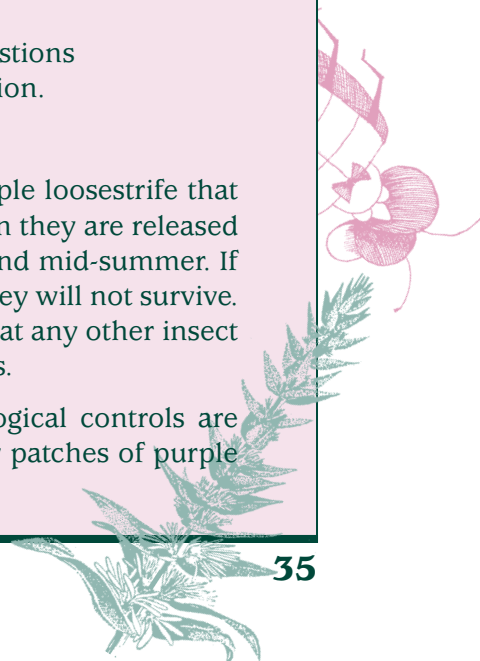
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4. Over a period of time—perhaps several days to a week—have students search for and record the locations where beetles are found. Attempt to identify the location of as many of the beetles as possible at any given time. (Perhaps assign several students to come in during lunch, recess, or study hall to look for beetles.) Students may want to sweep floors to find beetles. Continue all other normal daily activities in the room.
5. When searching for *Galerucella* beetles, if one is found on the host plant, purple loosestrife, it is considered to have reached its destination. Have students record how long it took for the beetle to find the loosestrife and the distance traveled from the original release site. Then remove the beetle from the experiment.
6. If any live *Galerucella* beetles are found elsewhere, have students record the location, but leave the beetles alone as they are still a part of the experiment.
7. If a dead *Galerucella* beetle is found, have students try to determine the cause of death (such as being stepped on, smashed in a book, caught in a spider web, etc.) and then record this information.
8. After a predetermined time has elapsed, have students use the information recorded to find out how many beetles made it to the “safe haven” of the purple loosestrife plant and how far they traveled in how long a time. Also, how many are either dead or missing and the suspected reasons for this. Have students graph their results.
9. Ask students to predict what the survival rates might be if more beetles were released, more purple loosestrife was made available, or if the loosestrife was closer to the release site.
10. Discuss variations that could be done to answer different questions about *Galerucella* beetle migration and survival during migration.

BACKGROUND INFORMATION

Survival of the *Galerucella* beetles depends on the amount of purple loosestrife that is available to them. The beetles actively search out the plant when they are released from captivity or emerge naturally from the soil in early spring and mid-summer. If the beetles do not find an adequate supply of purple loosestrife, they will not survive. In addition, the beetles are susceptible to all causes of mortality that any other insect may have to face, including predation, pesticides, and windshields.

In Europe and Asia, where the *Galerucella* beetles used as biological controls are native, the beetles continually migrate over long distances to new patches of purple





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(continued)

loosestrife. Old patches of the plant, having been attacked and weakened by as many as a hundred different kinds of insects, often disappear as the loosestrife is out competed by healthier plants of other species around them. Some *Galerucella* beetles also migrate from their wetland habitats in autumn to over winter in uplands. They return to the wetlands in the spring.

Thus, beetles reared and released here in Wisconsin can also be expected to find both new loosestrife patches and migrate in the fall and spring. In fact, biologists depend on the beetles to find new loosestrife plants since many hard to find patches of the plant will likely never receive beetles from DNR biological control cooperators.

It is important for us to understand the *Galerucella* beetles' local migratory behavior and determine what kinds of factors contribute to success or failure. Many beetles will die during migration, but if we know how many and why, we can better predict their effectiveness as biological controls. Perhaps something could even be done to make them more successful.

STUDENT ASSESSMENT

Students should be able to discuss the merits and short-comings of this activity and how their findings could or could not apply to what might occur in real life in an uncontrolled setting such as a wetland.

EXTENSIONS

Conduct the experiment using the following variations:

- Change temperature and/or light conditions (**note:** these conditions vary due to room lighting, etc.).
- Change plant size and/or number.
- Use both new and old growth purple loosestrife plants.
- Move entire experiment to a larger room like a gymnasium or auditorium (with permission).
- Leave the classroom door open, and place plants down the hall at different distances from the release site (with permission).
- Devise a way this same experiment or parts of it could be done outside.
- Relate potential hazards in the classroom to hazards that may be encountered outdoors.
- If any beetles are missing, extend the experiment for a longer period of time to see if any of the missing beetles return.

